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A FEW HINTS ON HARDENING, IMBEDDING, CUTTING, STAINING AND MOUNTING SPECIMENS.

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The rule I follow in the hardening of specimens is briefly this: I cut the original specimen into pieces, not exceeding three-quarters of a cubic inch, and put them in alcohol, to remain there from six to eight days; they are then placed in 95 per cent. alcohol for a day or two, until they have become firm, which is easily seen by pressing them with the fingers.

As soon as the specimen has become firm, a cork cut square or rectangular, with smooth surfaces, is prepared. The specimen is noted and numbered in a book, kept for the purpose, and the same number is put upon the side of the cork opposite which the specimen is to be placed. The specimen is secured to the cork in this wise: A thick solution of powdered gum acacia is made; a thin film is put on the cork. The specimen having been previously washed in water and dried, is placed upon the gummed cork and gently pressed down so as to expel all air-bubbles that might be between the specimen and the cork. Let the specimen stand a few moments in the air, then put a teasing needle into the cork, and submerge the cork and specimen, keeping the specimen "butter side up" in alcohol. Allow it to remain this way for four or five minutes until the gum becomes set, then remove the specimen from the alcohol, and with a knife remove the gum from the sides of the specimen. Then drop it, "butter side down," into a wide-mouthed jar containing 60 per cent. solution of alcohol, and let it remain for six to twelve hours, after which it will be ready for cutting.

There is a new method of imbedding, far superior to albumen or paraffin methods, which I can recommend from personal experience. It is called the celloidin method. The celloidin is manufactured by Shering of Berlin, and is for sale by Messrs. Bachrach Bros., of Baltimore, Md. Celloidin is a pure pyroxline, free from all organic constituents, and makes a clear solution, free from all sediment, when dissolved in equal parts of 95 per cent. alcohol and sulphuric ether. By this method all fragile specimens containing the products of inflammation may easily be cut without losing the contents of the vessels into which the inflammatory exudate has taken place. The specimen is hardened in alcohol as above described, but is allowed to remain forty-eight hours in absolute alcohol, from which it is taken and placed in sulphuric ether for two days. From the ether it is placed in a thin solution of celloidin, for the purpose of soaking it through and through—seven to ten days is sufficient to accomplish this end.

The specimens are imbedded in paper boxes in the usual manner, or as I usually do, imbed, and at the same time fastening them to the cork. I wrap a cork with heavy writing-paper and allow it to project an inch beyond the cork; the cork forms the bottom of the box. Pour upon the cork a thin film of the imbedding solution, and allow it to dry. Moisten this film with a drop of ether, adjust the specimen, add a little more of the celloidin solution, and allow it to become semi-solid, thus fixing the specimen. Then fill the box with a thicker solution, wholly covering the specimen, let stand in the air until semi-solid, remove paper and extra celloidin with a sharp knife, and place in a solution of 80 per cent. alcohol for twelve hours, when the specimen will be ready for cutting. Specimens when prepared in this way may, when cut, be stained in the different staining fluids. Care should be taken when clearing them not to use oil of cloves or absolute alcohol, for both dissolve the celloidin. Use alcohol of 95 per cent. and oil of origanum or oil of sanders. Where the former oil is used let the specimen remain from two to four days.

Celloidin comes in two forms—in plates and in shreds; the latter is to be preferred as it is more easily dissolved. The solution should be kept in a glass-stoppered bottle.

The microtome which I use is one manufactured in Leipzig, Germany, and is known as the Schanze Microtome. It cuts hardened specimens; and fresh specimens may be frozen and cut as easily as those hardened in alcohol. It has been widely used upon the continent, and in all laboratories it has given perfect satisfaction. It works rapidly and does its work well; it must be seen to be appreciated. Specimens may be cut as thin as $\frac{1}{2500}$ of an inch, and to the size of a half dollar in diameter. In cutting, the knife is kept flooded with alcohol to prevent tearing the specimen. The specimens are taken from the knife by means of a camel's-hair pencil, and are dropped into a vessel of water.

To color the sections, they are taken from the first dish and washed in pure water; the excess of water is absorbed by touching the specimens to a piece of blotting-paper; this is done so as not to dilute the staining-fluid. I prefer picro-carmine or alum-carmine and hematoxylin in the staining of animal tissues. From the staining-fluid the specimens are placed in water containing acetic acid, and allowed to remain a few moments. They are then washed until there is no more color given off, when they are transferred to alcohol of 96 per cent., where they remain for ten minutes, and are then submerged in oil of cloves for five or ten minutes.

To place the specimen upon the slide, I first float it upon a piece of paraffined paper (a trifle larger than the specimen) with the aid of a fine camel's-hair pencil. If there are wrinkles in the specimen I hold the paper and the edge of the specimen with the forceps and dip again and again into the oil of cloves until the wrinkles have disappeared. Transferring the specimen to the slide, place it face downwards upon the center of the slide and gently press a blotter upon the paraffined paper covering the specimen; this is to absorb the excess of oil. Carefully remove the paper with the forceps, and wipe the slide with a clean linen cloth, being careful not to disturb the specimen. Add a drop of Canada balsam, thinned with chloroform, and place the cover-glass in position. Do not press out the air-bubbles, they will disappear after the first twenty-four hours. Pressure upon the cover-glass often causes the specimen to break or become disarranged.

These methods as above described, I have found to work well, and if others will follow them there is no reason why they will not succeed in their hands.